

FEDERAL REPUBLIC OF GERMANY

Utility model writing DE 20100717 U 1

Application number: 201 00717.7

Filing date: 16. 1.2001

Date of registration: 5. 4.2001

Proclamation in the patent sheet: 10. 5.2001

Internal priority: 20002856. 1 18.02.2000

Owner: Glas Engels GmbH, 45356 Essen, DE; Muschiol, Michael, Dipl.-Ing., 45772 Mari, DE

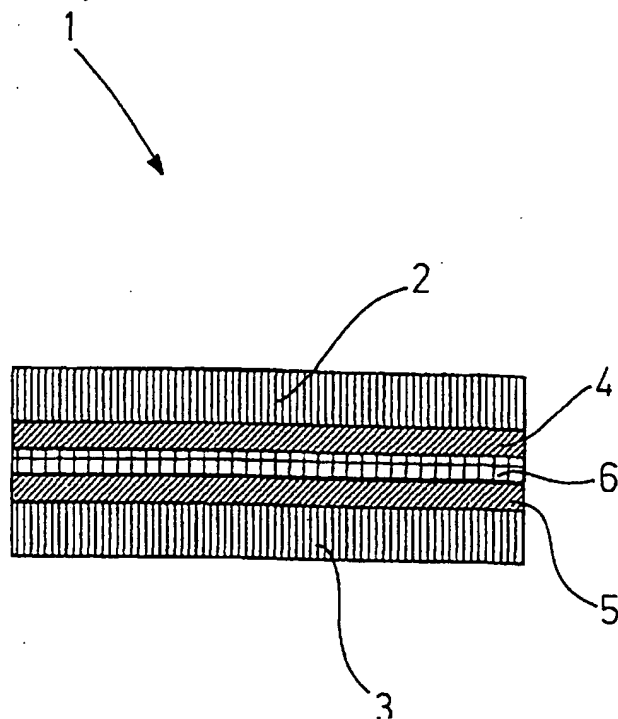
Representative: Wenzel & Kalkoff, 58452 Witten

**Title: Compound body made from a multilevel arrangement**

**Abstract:**

Compound body made from a multilevel arrangement of

- at least two glass sheets, of which at least one is transparent
- at least two PVB foils arranged between the glass sheets and
- between the PVB foils arranged patterns or pictures,
- with pressure and thermal treatment inseparably connected it is characterized, by the fact that
- the pattern- providing layer is a transparent or translucent foil (6), where
- at least one side is translucent or transparent to Ink Jet printing and
- exhibits a melting point over the annealing temperature necessary for inseparably connection of the layers of the compounded body (1).



## Description

The invention concerns a compound body from a multilevel arrangement of

- at least two glass sheets, of which at least one is transparent,
- at least two PVB foils arranged between the glass sheets and
- between the PVB foils arranged patterns, patterns or pictures,
- are inseparably connected with a pressure and a thermal treatment.

Compound bodies of this kind are established like so-called laminated glass. Two even or curved glass plates with suitably arranged surface forms are joined with the help of two laminated layers, which preferably consist of pressure and heat softened plastic.

From DE 4447171 a compound body of this kind is well-known, which are used for printing on textile tissue/fabric, leather or paper as pattern- providing situation. As artwork in one or multi color illustrations serve, patterns such an established compound body is essentially not transparent. There is if necessary the possibility of arranging the compound body with appropriate material choices that are translucent and/or translucent. The embedding of the above mentioned materials however always leads to a substantial reduction of the light permeability of the compound body, so that the exclusive use of such compound bodies, for example as windowpanes for a room, makes necessary the employment of additional lighting, in order to ensure a sufficient brightness, which is necessary also for the visualization of the illustrations.

A laminated glass disk is well-known also in the DE-29706880, whereby with this well-known laminated glass disk no pattern- providing layer is embedded. The illustration which can be reproduced is applied directly on one of the two PVB foils on that other PVB foil facing the side. The PVB foil is however only conditionally suitable as substrate for one-color or multi color illustrations, similar patterns, since the surface of the PVB foil exhibits only a very small adhesive strength for colors and/or ink which can be used, therefore to lay colors and/or ink on the foil surface area. Therefore only very roughly screened illustrations can be reproduced error free. Since the PVB foils under the influence of pressure and temperature becomes soft as supposed, in order to form a homogeneous compound body, it creates a distortion and a distortion of the illustration applied on a PVB foil. The PVB foil is not suitable as substrate for highly detailed illustrations.

It is therefore the goal of the available invention to create a compound body translucent as initially specified be permitted and the rendition and perception of highly detailed illustrations.

According to invention this task is solved by the fact that

- the pattern- providing layer is a transparent or translucent foil, where
- on at least one side is translucent or transparent to Ink Jet printing and
- exhibits a melting point over the annealing temperature necessary for inseparably connection of the layers of the compounded body.

The multilevel structure of PVB foils, glass sheets and pattern- providing layer is exposed to a unit of forming a homogeneous compound body to determined pressures and temperatures, during a

fixed period, whereby the PVB foils melt opens and connect themselves inseparably with the pattern- providing layer and/or the glass sheets. This happens for example in autoclaves. The levels of the pressures and temperatures as well as the necessary period determine themselves thereby as a function of the selected materials. Usually the pressures necessary for the formation of the homogeneous compound body are within preferably 10 to 20 bar, the temperatures preferably lie thereby between 135°C and 185°C.

The use of a separate foil for the reception of the Ink Jet printing as pattern- providing layer makes used ink and/or color for the foil possible an optimal adaptation over the essentially free material choice to one for the Ink-Jet printing. It is thus possible, also highly detailed, to apply and/or transfer photo-realistic illustrations to the foil, whereby it is ensured that colors and/or ink on the foil surface are well transferred and thus does not run or smear.

Moreover it is ensured by the use of the separate pattern- providing foil I same melting point exhibit, which lies over the temperatures necessary for the formation of a homogeneous compound body, that the pattern- providing foil does not deform under the influence of the temperature, so that the resulting illustration applied on the foil remains also in the homogeneous compound body undistorted.

The use of at least that when pressing and warming softly bringing the PVB foils together, which are arranged on both sides the foil exhibiting the Ink Jet printing guarantee thereby the formation of the homogeneous compound body. After completion the pressure and temperature treatment and thus the homogeneous compound body are transparent and/or translucent PVB foils. The PVB foils can be additionally also colored formed whereby the organization possibilities of the compound body are increased.

The light permeability of the compound body can be determined on the one hand over the election of the foil and on the other hand over the covering degrees of the ink and/or color used for the Ink Jet printing. Depending upon area of application of the compound bodies compound bodies with a desired light permeability can be established thus in a simple manner.

One of the two glass sheets of the compound body is in principle transparent formed. The second glass disk can be however both transparent or also translucent formed. Also the use of a colored second glass disk is possible. These different arrangement possibilities of the second glass disk make it possible to train the compound body. If necessary also optical effects can be obtained by the election of the second glass disk.

The production of the Ink Jet printing can take place for example with appropriate InK-Jet printers economically. The production is economical due to the small tool employment and on the other hand by the possibility of the individual adaptation to any motive. The printer can be connected in simple way with conventional computer systems. Using appropriate soft and/or hardware on these computer systems are possible; also photos, transferring designs similar without or post-effect rework in high resolution and in a depth of shade of more than 8-bits to the foil.

The imbedding of the printed on foil between the PVB foils and the glass sheets ensures besides a high UV-protection, so that effectively one prevents the fading the one-color or multi color illustrations. Besides the printing on the foil is protected against mechanical influences.

In principle arbitrary materials can be used for the translucent or transparent foil, which exhibit a sufficient binding effect for the ink and/or color which can be laid on. After a favorable further training of the invention the transparent or translucent foil exhibits however a coating. By a

coating in the sense of the utility model thereby a situation laid on the foil surface of the pattern-providing foil is understood, which serves as background for the ink and/or color which can be laid on and exhibits a sufficient binding effect.

The employment of the coating makes possible also the use of such foil materials, whose uncoated foil surface is unsuitable as substrate for the ink and/or colors.

The material for the coating is present for example in dissolved, liquid form and can be applied in arbitrary way, for example by spraying on or evaporating on the foil surface. This coating can be coordinated with which can be used the ink and/or colors and ensured thus among other things an optimal drying process and adhesion the same on the foil surface. Thus in supplementing way one prevents to running or smearing.

After a preferential execution form of the invention the coating is based on water. The coating which can be laid on is preferably present in liquid form, whereby water serves as substrate for particles solved in the liquid. These particles are laid on with the water on the foil surface which can be coated. After the water evaporated for example or evaporated remains the particles on the foil surface and forms the coating.

Such coatings can be processed in a simple manner. Besides a load of the environment is reduced, for those devoted to the employment of solvent-based coatings.

After a particularly favorable further training of the invention the transparent or translucent foil consists of polyester. Such foils are particularly economical, so that the manufacturing costs for the compound body can be reduced. The foils exhibit besides a high flexibility, which simplifies the processing in supplementing way.

After a further arrangement of the invention the Ink Jet printing consists of pigment ink. Such inks are suitable in particular for the production of so-called Fine Art printers and Portrait taking with complex color transitions. Pigmented ink make possible the excellent use of skin tones, Pastel tones and flowing color transitions.

Below is a construction example of the invention described on the basis of a design. The design shows a crosssectional view of a compound body.

The design shows an execution form of the compound body

1. The compound body 1 covers two glass sheets 2, 3, by means of two PVB foils the 4, 5 is connected. Between the PVB foils 4, 5 is a pattern- providing layer. The pattern- providing layer is formed by a translucent or transparent foil 6, which exhibits here a not reproduced Ink Jet printing on one side.

The PVB foils 4, 5 are transparent and uncolored just like the glass sheets 2, 3. They can be implemented however also in the area of application accordingly colored and partial transparency.

When pressing together and warming up the multilevel structure of the compound body 1 the PVB foils 4, 5 become soft and establish with the glass sheets 2, 3 and the pattern- providing layer a homogeneous, indissoluble compound forming by the printing on foil 6.

## Claims

1. Compound body from a multilevel arrangement of at least two glass sheets, from which at least

one is transparent,

- at least two PVB foils arranged between the glass sheets and
  - between the PVB foils an arranged pattern or picture-providing layer,
  - with pressure and thermal treatment they are inseparably connected and is characterized, by the fact that
  - the pattern- providing layer is a transparent or translucent foil (6), where
  - on at least one side is translucent or transparent to Ink Jet printing and
  - exhibits a melting point over the annealing temperature necessary for inseparably connection of the layers of the compounded body (1).
2. Compound body after claim 1, characterized by the fact that the transparent or translucent foil (6) exhibits a coating.
  3. Compound body after claim 2, characterized by the fact that the coating is based on water.
  4. After compound body or several of the preceding claims, characterized by the fact that the transparent or translucent foil (6) consists of polyester.
  5. After compound body or several of the preceding claims, characterized by the fact that the Ink Jet printing is made of pigment ink.

